IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

First named inventor:	Klaus Fröhlich
Serial No:	10/709,513
Filing Date:	5/11/2004
Title:	Device for Connecting Ends of Bars
Examiner:	Joshua T. Kennedy
Art Unit:	3679

APPEAL BRIEF

Appellant herewith submits the Appeal Brief pursuant to 37 CFR 41.37 in support of the Notice of Appeal filed August 9, 2006, in the Patent and Trademark Office.

The required **fee for filing a brief in support of an appeal** pursuant to 37 CFR 41.20(b)(2) in the amount of $500.00 is paid herewith.

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REAL PARTY IN INTEREST

Real party in interest is the assignee of record, **Halfen GmbH & Co. KG**, of Liebigstr. 14, 40764 Langenfeld-Richrath, Germany.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

Claim 1 - rejected, on appeal.

Claim 2 - rejected, on appeal.

Claim 3 - rejected, on appeal.

Claim 4 - rejected, on appeal.

Claim 5 - rejected, on appeal.

Claim 6 - rejected, on appeal

Claim 7 - rejected, on appeal

Claim 8 - rejected, on appeal.

Claim 9 - rejected, on appeal.

Claim 10 - rejected, on appeal

Claim 11 - rejected, on appeal

Claim 12 - rejected, on appeal

Claim 13 - canceled.

STATUS OF AMENDMENTS

No amendment after final was filed; a response in the form of a Pre-appeal Brief Request for Review was submitted.

The claims in the appendix reflect the changes made by amendment filed 8 December 2005.

SUMMARY OF CLAIMED SUBJECT MATTER

Claim 1 refers to a device for connecting bar ends. The device comprises a pipe section (1) for receiving bar ends (3, 4) to be connected (Fig. 1). Clamping elements (8, 9) are provided that each have an outer thread (12); see Figs. 1 and 2. The pipe section has threaded bores (13) in which the clamping elements (8, 9) are secured by being screwed in (see Figs. 1 and 2). The clamping elements (8, 9) are arranged in a first row (A) and a second row (B) on the same side of the pipe section (1) relative to a circumference of the pipe section (Fig. 2). The clamping elements (8) of the first row (A) are staggered relative to the clamping elements (9) of the second row (B) in a longitudinal direction of the pipe section (see Fig. 3). The basic configuration is explained in particular in paragraphs 0024-0026.

The gist of the invention is providing two rows of clamping elements on the same side of the pipe section and staggering the clamping elements of the two rows as shown in particular in Figs. 3 and 6. As set forth in the specification (paragraph 0006), this arrangement makes it possible that the clamping elements can be arranged sequentially more tightly to one another so that a greater clamping force can be applied over a shorter length so that the length of the pipe section can be reduced. The arrangement of the two staggered rows relative to one another also provides that, about the circumference of the bar ends, the clamping forces act at three location on the bar ends: at the two locations where the two rows of clamping elements engage the bare ends and at the location where the wall of the pipe section is forced against the bar ends (essentially diametrically opposed to the clamping elements). By arranging the two rows on the same side and at an angle that is equal to or less than 60°, preferably, approximately 30°, the two rows are close to one another and easily accessible so that the clamping elements can be inserted and tightened easily without having to change the position of the pipe section.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1 to 5 and 7 to 9 are unpatentable under 35 U.S.C. 103(a) over *Holdsworth (US 5,909,980)* in view of *Michelson (US 6,139,550).*

Whether claim 10 is unpatentable under 35 U.S.C. 103(a) over *Holdsworth (US 5,909,980)* in view of *Michelson (US 6,139,550)* and further in view of *Hope (US 4,666,326).*

Whether claim 6 is unpatentable under 35 U.S.C. 103(a) over *Holdsworth (US 5,909,980)* in view of *Michelson (US 6,139,550)* and further in view of *Ecklesdafer (US 5,154,652).*

Whether claims 11 and 12 are unpatentable under 35 U.S.C. 103(a) over *Holdsworth (US 5,909,980)* in view of *Michelson (US 6,139,550)* and further in view of *Mochizuki (US 5,974,761).*

ARGUMENT

Rejection of claims 1 to 5 and 7 to 9 under 35 U.S.C. 103(a) over *Holdsworth (US 5,909,980)* in view of *Michelson (US 6,139,550).*

The examiner states that *Holdsworth* discloses a device for connecting bar ends having a pipe section (112) and clamping elements (142) with an outer thread. The pipe section has threaded bores for receiving the clamping elements and the clamping elements are arranged in a first row. The examiner sets forth that *Holdsworth* lacks a second row of clamping elements on the same side and parallel to the first row and also shows no staggered arrangement and no angled arrangement at 60 degrees or less.

Examiner refers to *Michelson* to show a plating system using bone screws for connecting a plate to a bone where the screws are arranged in two staggered rows and angled in a range of 25 to 90 degrees. Examiner argues that *Michelson* is evidence of the recognition in the art that staggered rows provide a secure engagement on cylindrical objects and refers to col. 26, lines 66-67; col. 27, lines 1-10; and Figs. 96A-97C. In examiner's opinion, it would therefore have been obvious to employ the arrangement of *Michelson* in the device of *Holdsworth*.

Appellant disagrees. *Holdsworth* discloses a tubular coupler for reinforcing bars that comprises an elongate tubular metal body 112 with converging inner wedge surfaces 125. The tubular body 112 is provided with spaced threaded holes; screws 142 are threaded into the holes for securing the reinforcing bars. The threaded holes are arranged in a single row. The securing action of the coupler 112 is shown in Fig. 12. There is a three-point fixation of the bars in the coupler 112 as a result of the tightened screw 142 and the oppositely arranged projecting surfaces 125. *Holdsworth* does not suggest that more than one row could be used since *Holdsworth* discloses an interaction of the clamping force applied by the screws 142 with two opposed wedge-shaped projections125 providing a seat for the bar. It does not make sense to use a second row of clamping screws in such an arrangement because a safe three-point clamping action is already provided.

The *Michelson* reference discloses a skeletal plating system while the present invention relates to reinforcement bars in concrete construction. *Michelson* deals with the attachment of a **plate** to bone material whereas the invention is concerned with connecting

two bar ends by means of a sleeve into which the two bar ends are inserted. *Michelson* secures a plate to one side of a cylindrical body. The screws that are used for attachment **penetrate deep into the bone material in order to attach the plate to the bone**. The tightening action of the screws pulls the plate against the bone material.

The examiner contends that *Michelson* provides evidence of art recognition that staggered rows provide a secure attachment on cylindrical parts and refers to col. 27, lines 6-10: "Such a crossed configuration of bone screws 30 provides an extremely stable engagement of plate 960 to the bone as they are very close together and diagonally crossed within the same bone thus trapping an area of bone between them". It is respectfully submitted that the teaching to be derived from this disclosure is that crossed screws that cut into the (bone) material provide a secure attachment because (bone) material is trapped between the screws; this is also set forth in connection with another configuration (Fig. 36) showing screws 30 in a crossed arrangement. The crossed arrangement is described as a "claw" of a rigid triangular frame structure leading to a highly secure attachment of the plate 2 because of the trapping of the wedged material between the angled bone screws (see col. 20, lines 52-60). The reference teaches that the angled arrangement of screws provides a "claw" tightly gripping the wedged material so that a plate is connected securely to one side of a cylindrical body. The screws positively engage and wedge the material. This is independent of whether the two screws are arranged aligned with one another or staggered; the clawing effect is caused by the angled arrangement and wedging of material between the screws that penetrate the (bone) material. The reference does not generally teach, as suggested by the examiner, a recognition in the art that providing staggered rows will yield a secure attachment of a cylindrical object per se - the teaching to be derived is that screws penetrating into material in a crossed arrangement wedge material between them and provide a "claw" that tightly secures the plate to the cylindrical body.

The clawing and wedging action of the two rows of screws has nothing to do with securing bar ends inside a sleeve by applying clamping forces that act externally on a cylindrical body and push the bar against an abutment, thus providing a friction connection.

Appellant would like to stress that the connection in *Michelson* is achieved by attaching a plate by screws to bone in that the screws penetrate into the bone material and

pull plate and bone tightly against one another. The present invention and *Holdsworth* deal with **clamping** rods inside a sleeve - the sleeve is not to be tightly pulled against the rod but instead the rod is to be clamped uniformly at several locations within the sleeve. In contrast to *Michelson,* the screws of the present invention and of *Holdsworth* are used to **push** the rod material away from the sleeve against an abutment and not to pull the rod material tightly against the sleeve. The bar ends are only to be clamped within the sleeve by the clamping elements that apply a force onto the exterior of the bar ends and push them against opposed abutments so that the rod is subjected to a clamping action at several locations in the circumferential direction.

The *Michelson* reference deals with a different problem, i.e. tightly and securely **pulling** a plate and cylindrical object against one another in order to provide a stable connection between the two parts by positive engagement. *Michelson* teaches that, in regard to securing a plate to a cylindrical object, a tighter connection between the two elements is realized when two rows of screws are used because the material of the bone is trapped between the screws. This is a different concept from employing a clamping element that pushes an element away in order to provide a clamping action at opposed abutments located opposite the clamping element.

In comparison to *Holdsworth*, the present invention provides an innovative approach to the clamping of bar ends in a sleeve: instead of providing a complex and difficult to manufacture interior of the sleeve (in the form of a "clover leaf"), the present invention employs a pipe section having simply a round interior and two rows of screws on the same side of the sleeve (pipe section) so that the two rows provide adjustable abutments relative to the opposite inner wall of the pipe section that provides the third fixation point.

Holdsworth enables secure clamping by providing a safe three-point fixation of the bar end within a sleeve with screws that push the bar ends against two oppositely arranged abutments. *Holdsworth* provides a simple solution because the three-point fixation requires only one screw to be tightened for each clamping point; the bar will center itself between the two abutment surfaces 125 and the screw tip. The attachment type of *Michelson* has nothing in common with the **clamping concept** of *Holdsworth*. A person skilled in the art has no reason to look at *Michelson* because a penetration of the screws into the bar ends is not desirable and because the arrangement of two staggered rows of screws is taught as

a means for pulling two parts tightly toward one another and for improving the tight connection by trapping material between the screws and providing a positive "claw" gripping action. This is not applicable in connection with *Holdsworth* as *Holdsworth* only applies external clamping forces on the circumference of the bar ends. *Holdsworth* and *Michelson* apply to different fastening principles.

Examiner applies the *Michelson* reference in hindsight in view of the solution presented by the present invention - the *Holdsworth* solution with three-point fixation action does not lend itself to using two rows of screws for clamping the bar. *Michelson* does not generally teach that staggered rows provide a safe attachment on a cylindrical part but teaches that a plate can be safely connected by screws penetrating in a crossed arrangement into a cylindrical body.

Claim 2

The examiner argues (page 8 of the final action, lines 3 and 4) that the present invention does not provide anything in the claim language that requires the connection to be realized strictly by external clamping forces. Applicant respectfully disagrees: claim language of claim 1 defines **clamping** elements and claim 2 defines "clamping elements have ends for **applying a clamping force** on bar ends" and "the ends of the clamping elements **apply the clamping force** in different directions".

Examiner argues that *Holdsworth* shows in Fig. 10 that the clamping elements have ends facing the bars and the ends of the clamping elements act in different directions on the bar ends. This is not so: the clamping elements 142 are parallel to one another and therefore their ends act in the same parallel direction on the bars.

Reference is being had to the reasons discussed in detail in connection with claim 1. The combination of *Holdsworth* and *Michelson* as proposed by the examiner especially cannot make obvious the invention as claimed in claim 2. *Holdsworth* teaches a three-point fixation action that relies on a single row of screws for clamping the bar in combination with opposed ribs which, as evidenced by *Hope* (see col. 3, lines 58-68; see discussion in regard to claim 10), is beneficial as it provides quick release. The combination of *Holdsworth* with *Michelson* proposing two rows of screws penetrating the material and gripping the wedged material like a claw is not obvious because of the different types of connections that are proposed: clamping by applying clamping forces in different directions

(the bar ends are pushed by the screws against an abutment) versus positive engagement where the screws penetrate the material and pull the material toward the plate to be attached. While the clawing action may be necessary to attach a plate securely to a cylindrical object, it is not needed and not desirable in an arrangement where a safe three-point clamping is achieved by a single row of clamping elements that push the bar ends against opposed ribs.

Claim 3

According to claim 3, the first and second longitudinal axes of the clamping elements/threaded bores of the first and second rows are arranged at an angle (α) of equal to or less than 60° relative to one another. This is not shown in *Holdsworth*.

Michelson teaches that the screws should penetrate the material in a crossed arrangement in order to wedge material between the screws and provide a "claw" that traps the wedged material between the angled bone screws (see col. 20, lines 52-60, of *Michelson*). This does not teach that it is beneficial to arrange two rows of clamping elements at an angle of equal to or less than 60 degrees for clamping bar ends inside a pipe section.

Claim 5

According to claim 5, the first and second longitudinal axes of the clamping elements/threaded bores are at least approximately parallel to one another and are positioned in a plane laterally displaced relative to a diameter of the pipe section, respectively. This is not shown in *Holdsworth*.

Michelson teaches screws that extend parallel and penetrate the bone material as shown in Figs. 96A-96C. However, as the teaching of *Michelson* concern the positive engagement of screws in bone material, this parallel arrangement cannot teach that the parallel displaced arrangement is beneficial for clamping elements acting on bar ends inside a pipe section.

Rejection of claim 10 under 35 U.S.C. 103(a) over *Holdsworth (US 5,909,980)* in view of *Michelson (US 6,139,550) and Hope (US 4,666,326)*

Examiner argues that *Hope* shows at least one clamping screw positioned opposite the clamping elements of the first and second rows and cites *Hope* as follows: "the pair of screws provides a strong grip and ensures that the sleeve fitting is fixedly located relative to

the reinforcing bar". In examiner's opinion it would have been obvious to employ the clamping screw of *Hope* in the arrangement of *Holdsworth* modified by *Michelson.*

It is respectfully submitted that *Hope* teaches the use of two opposed screws for securing the bars, i.e, there are two oppositely arranged screws constituting the securing mechanism for the ends of the bars (shown in Figs. 1 and 2). The teaching to be derived from this reference is a securing mechanism of two diametrically opposed screws but not a clamping screw to be arranged opposite first and second rows of clamping elements provided for a securing action, especially since the reference teaches in lines 58 to 68 of col. 3 that the arrangement of two opposed screws is not really beneficial and that a single screw in combination with opposed ribs etc. is much easier (this is the type of arrangement shown in *Holdsworth*).

Rejection of claim 6 under 35 USC 103(a) over *Holdsworth (US 5,909,980)* in view of *Michelson (US 6,139,550)* and *Ecklesdafer (US 5,154,652).*

Claim 6 sets forth that a longitudinal edge of the threaded bores is positioned at least approximately on a tangent of an inner pipe wall surface of the pipe section.

Examiner argues that it would be obvious to use the teaching of *Ecklesdafer* where it is proposed to use elongate fasteners to tangentially engage the opposing sides of each shaft to prevent longitudinal displacement. The two fasteners are bolts 5 that engage the grooves 9, 10 of the shafts and pass through holes 7. This provides a possitive lock of the shafts; no clamping forces are exerted by the bolts 5 on the shafts.

Such an arrangement is not claimed or suggested in the present invention. Claim 6 refers to the embodiment of Fig. 5 where a longitudinal side of the threaded bore 13 extends tangentially to the inner pipe section wall and where the clamping elements 8, 9, as explained in paragraph 0028 of the specification, provide a clamping force at a right angle to the tangent T.

A fastener that projects tangentially past the bar ends and applies no clamping force on the bar ends cannot suggest that longitudinal edges of the threaded bores of clamping elements acting by a clamping force on the bar ends are arranged tangentially.

Rejection of claims 11 and 12 under 35 USC 103(a) over *Holdsworth (US*

5,909,980)* in view of *Michelson (US 6,139,550)* and *Mochizuki (US 5,974,761).

Claim 11 sets forth that each section of the pipe section that receives a bar end has at least one transverse pin that extends at least approximately at a right angle to a longitudinal axis of the pipe section and is arranged in immediate vicinity of an inner pipe wall. This transverse pin is provided in addition to the two rows of clamping elements provided for clamping the bar ends.

The examiner argues that *Mochizuki* discloses in col. 2, lines 45-49, a taper pin that is tangential to the reinforcing bar and is provided for fastening the reinforcing bar to the supporting projection. This taper pin (Figs. 10, 11) is an alternative to the bolt 7 shown in most illustrated embodiments (Figs. 2 to 7); see lines 43-44 of col. 2: "the fixing means is selected from a bolt and a pin"; see col. 5, lines 7-9: "As the fixing means for use with the mortar grout splice sleeve1, a pin is also utilizable to fasten the reinforcing bar 20 in place of the screw bolt ...". Thus, the bar 20 is either fastened by the bolt 7 or the pin 23 or the pin 32 (compare Figs. 3, 4, 10, 11). This can only suggest to a person skilled in the art to replace the screw pins 142 of *Holdsworth* with pin 23 or 32 as shown in Figs. 10 and 11 of *Mochizuki*. This teaching cannot suggest to use a transverse pin in addition to the two rows of clamping elements that are already provided.

CONCLUSION

For the reasons stated above, appellant believes that appealed claims are allowable over the cited prior art references, and respectfully requests that the Board of Patent Appeals and Interferences reconsider the rejection of the appealed claims and reverse the decision of the examiner in whole.

Authorization is herewith given to charge any fees or any shortages in any fees required during prosecution of this application and not paid by other means to Patent and Trademark Office deposit account 50-1199.

Respectfully submitted on October 11, 2006,

/Gudrun E. Huckett/

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CLAIMS APPENDIX

1. A device for connecting bar ends, the device comprising:

a pipe section for receiving bar ends of bars to be connected;

clamping elements each having an outer thread;

wherein the pipe section has threaded bores in which the clamping elements are secured by being screwed in;

wherein the clamping elements are arranged in a first row and a second row on the same side of the pipe section relative to a circumference of the pipe section;

wherein the clamping elements of the first row are staggered relative to the clamping elements of the second row in a longitudinal direction of the pipe section.

2. The device according to claim 1, wherein the clamping elements have ends for applying a clamping force on bar ends and wherein the ends of the clamping elements apply the clamping force in different directions, respectively.

3. The device according to claim 1, wherein the threaded bores and the clamping elements of the first row have first longitudinal axes and wherein the threaded bores and the clamping elements of the second row have second longitudinal axes, wherein the first and second longitudinal axes are arranged at an angle (α) of $\leq 60°$ relative to one another.

4. The device according to claim 3, wherein the angle (α) is approximately 30°.

5. The device according to claim 1, wherein the threaded bores and the clamping elements of the first row have first longitudinal axes and wherein the threaded bores and the clamping elements of the second row have second longitudinal axes,

wherein the first and second longitudinal axes are at least approximately parallel to one another and are positioned in a plane laterally displaced relative to a diameter of the pipe section, respectively.

6. The device according to claim 1, wherein a longitudinal edge of the threaded bores is positioned at least approximately on a tangent of an inner pipe wall surface of the pipe section.

7. The device according to claim 1, wherein the clamping elements of the first row each are positioned between two of the clamping elements of the second row, respectively.

8. The device according to claim 1, further comprising a transverse element, arranged at least approximately at a longitudinal center of the pipe section.

9. The device according to claim 8, wherein the transverse element projects diametrically through the pipe section and is a clamping pin or a groove pin.

10. The device according to claim 1, wherein each section of the pipe section that receives a bar end has at least one clamping screw that, relative to the circumference of the pipe section, is positioned essentially opposite the clamping elements of the first and second rows.

11. The device according to claim 1, wherein each section of the pipe section that receives a bar end has at least one transverse pin that extends at least approximately at a right angle to a longitudinal axis of the pipe section and is arranged in immediate vicinity of an inner pipe wall.

12. The device according to claim 11, wherein the at least one transverse pin is a groove pin or a clamping pin and is comprised of hardened material.

EVIDENCE APPENDIX

- NONE -

RELATED PROCEEDINGS APPENDIX

- NONE -